BIOMEDICAL WASTES

IN

BRITISH COLUMBIA

EXECUTIVE SUMMARY AND SUMMARY OF RECOMMENDATIONS TO THE REPORT OF THE BRITISH COLUMBIA TASK FORCE ON BIOMEDICAL WASTE MANAGEMENT

MAY 1989

MINISTRY OF ENVIRONMENT/MINISTRY OF HEALTH
GREATER VANCOUVER REGIONAL DISTRICT/CITY OF VANCOUVER

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90-05244/

Canadian Cataloguing in Publication Data

British Columbia Task Force on Biomedical Waste Management.

Biomedical wastes in British Columbia : executive summary ...

ISBN 0-7718-8773-6

1. Hospitals - British Columbia - Waste disposal. 2. Health facilities - British Columbia - Waste disposal. I. Title.

RA969.45.B752 1989 363.1'575 C89-092140-7

Executive Summary

In response to serious concerns about the management of biomedical wastes in British Columbia, the Deputy Ministers of Environment and Health formed a Task Force on October 1, 1987 to investigate the situation and to recommend a broad biomedical waste system for the Province. This report describes the work of the British Columbia Task Force on Biomedical Waste Management. This summary follows the organization of the twelve major chapters of the report.

Introduction

Recently there have been growing numbers of reports about problems with the management of biomedical wastes. Incidents in this Province such as human anatomical waste appearing in the municipal waste stream, waste management workers being sprayed with blood, and wildlife dying from eating carcasses contaminated with toxic drugs spurred the formation of the present Task Force.

Composed of members from the Ministries of Environment, Health, the Greater Vancouver Regional District, and the City of Vancouver, the Task Force was requested to 1) review the definition and classification of biomedical wastes, 2) develop a B.C. biomedical waste inventory, 3) review existing and available biomedical waste technologies, 4) evaluate the biomedical waste requirements of other jurisdictions, and 5) recommend a system for managing biomedical wastes in the Province. It was anticipated that the work of the Task Force would take about one year, and the due date for the final report, to be submitted to the Deputy Ministers of Health and Environment, was set at December 1, 1988.

Biomedical Waste Definitions, Classification, Sources, Hazards and Impacts

After a review of biomedical waste definitions, classification schemes, and lists of biomedical waste sources from various agencies and jurisdictions, the Task Force adopted working definitions, biomedical waste categories, and sources upon which to base its work.

The biomedical waste categories include anatomical solid and liquid waste from humans and animals, microbiological wastes such as waste serums and vaccines, non-anatomical wastes such as equipment, waste sharp items such as hypodermic syringe needles, called "sharps", and chemical and pharmaceutical wastes. Sources such as hospitals, public health units, doctor's offices and clinics, laboratories, veterinary clinics, blood banks, and crematoria were addressed.

The Task Force devoted a substantial amount of time to the issue of the actual and potential impacts and hazards of biomedical wastes. It was concluded that while there is little evidence of significant adverse human health or environmental impacts from the typical handling of these wastes, adverse impacts can and do occur if the wastes are not handled properly.

Sharps can cause physical injury, infectious wastes can cause disease, and waste chemicals and pharmaceuticals various toxic impacts. Diseases such as AIDs and hepatitis B were frequently discussed. In addition to the physical impacts of biomedical wastes are psychological factors such as perception and attitude. The Task Force observed that the perception of risk associated with biomedical waste can vary remarkably, and often differs from the risk evaluated from a scientific or medical standpoint.

Survey of Non-Governmental Stakeholder Activities and Needs

Input was sought from a host of biomedical waste stakeholders. Regional governments, medical laboratories, waste management companies, institutions such as hospitals and public health units, and professional organizations were some of the major stakeholders invited to provide information on their biomedical waste needs and activities. There was broad agreement that a system for managing biomedical waste was need in B.C. and that the proper management of waste sharps was a high priority. It was evident that more education, training, and information were needed by most biomedical waste stakeholders.

Task Force Questionnaire Survey

In order to determine the nature, volumes, and types of biomedical wastes generated in British Columbia, the Task Force developed and distributed two questionnaires. One was used for hospitals, and the other was sent to veterinary clinics, family physicians, dentists, the Canadian Red Cross and university animal care facilities.

Inventory of Biomedical Waste In B.C.

The Task Force determined that the generation rates for biomedical wastes in the Province are similar to those rates from other jurisdictions. It is estimated that hospitals in B.C produce a total of about 4 kilograms of waste per bed per day, that infectious waste comprises about 10% of that total, 0.4 kg/bed/day and that biomedical wastes are produced at a rate of about 0.5 kg/bed/day. Based on 20,296 hospital beds in the Province, and information from a direct hospital survey, it is estimated that a total volume of 16 tonnes of biomedical waste are produced daily in B.C. This compares with an estimate of 10 tonnes per day in B.C. based on a literature-based biomedical waste generation rate.

Biomedical Waste Handling, Storage, Treatment and Disposal

This chapter reviews the biomedical waste technologies used in the Province, and then considers the technologies available. Major issues involve waste segregation, packaging, labelling, compaction, treatment and disposal to sanitary sewers or landfills and incineration. Currently much of the biomedical waste in the Province is burned in incinerators that are believed to be inadequate. Some biomedical wastes are now routinely disposed of in sanitary sewers and landfills in contravention of existing Provincial regulations and municipal by-laws.

Legislative and Regulatory Biomedical Waste Controls

The Task Force carefully reviewed existing legislation on biomedical wastes. There appears to be no comprehensive legal system addressing the management of biomedical wastes from "cradle-to-grave" in North America. Nevertheless, attempts are being made Nationally to develop such a system, but it may be several years before it is ready for implementation. In the meantime, regulations for special wastes under the Provincial Waste Management Act apply now to infectious wastes, which are part of the biomedical waste stream.

General Biomedical Guides

The eighth chapter in this report reviews a number of guides covering different aspects of biomedical waste management. The Canadian Standards Association standard "Handling of Waste Materials within Health Care Facilities" is particularly relevant. Other guides considered come from the United States Centres for Disease Control and Environmental Protection Agency, Hospital Accreditation Agencies, the Canadian Centre for AIDs, and the World Health Organization.

Regulatory Agency Administrative Activities

The Task Force has briefly summarized the roles, responsibilities and activities of major government agencies addressing biomedical wastes in British Columbia. The agencies included are the B.C. Ministries of Environment and Health, the Greater Vancouver Regional District, and several Federal and National agencies.

Summary of Reports on Biomedical Wastes

A number of major reports on biomedical wastes have appeared during the last few years, and the authors of several have had mandates similar to that of this Task Force. Thus it was regarded as essential that these reports be reviewed to assist in the identification of major issues and the clarification of contentious points. Chapter 10 contains a summary of nine of these reports.

General Discussion

Chapter 11 summarizes the observations and needs from the previous ten chapters. In this Chapter the Task Force focusses intently on the issue of biomedical waste technologies and practices. The main needs identified are summarized below:

- a uniform definition for biomedical wastes
- guidelines for a wide range of biomedical waste issues
- a uniform system for administering, managing and communicating about biomedical wastes.
- cost-effective biomedical waste technology options
- education and training programs on biomedical wastes

SUMMARY OF RECOMMENDATIONS

DEFINITION AND CLASSIFICATION OF BIOMEDICAL WASTE

1. Until a National consensus on a definition is achieved, it is recommended that a biomedical waste definition for interim use in British Columbia be adopted by the Province. The Task Force recommends that the detailed definitions provided in the Appendix to this summary be used.

2. It is recommended that continued support be given to the Canadian Council of Resource and Environment Ministers (CCREM) and Transport Canada in their efforts to develop a National definition for biomedical wastes.

3. It is recommended that agencies and organizations that develop standards and guidelines for biomedical waste management be encouraged to develop definitions for biomedical waste that are consistent with those developed Nationally. It is also recommended that city, municipal and regional government authorities be encouraged to amend bylaw definitions pertaining to biomedical wastes to achieve consistency with Provincial definitions adopted or developed.

HAZARDS AND IMPACTS OF BIOMEDICAL WASTE

4. Until National initiatives are complete, it is recommended that the special biomedical wastes[1] and chemical and pharmaceutical wastes defined by the Task Force be considered as those biomedical wastes requiring special handling, treatment and disposal in British Columbia.

5. It is recommended that the Province and other government agencies monitor research into the physical hazards of biomedical wastes and their fate and impacts when disposed of and/or treated.

NON-GOVERNMENTAL STAKEHOLDER ACTIVITIES

6. It is recommended that governments in B.C. take initiatives to ensure that adequate biomedical waste management facilities are developed in the Province.

7. It is recommended that governments in B.C. develop and implement legislative, regulatory and administrative programs to control biomedical wastes.

8. It is recommended that contingency plans providing alternative disposal methods for biomedical waste be developed by waste generators.

[1] Means the types and sources of biomedical wastes that should be handled, treated, and disposed of in a special manner.

BIOMEDICAL WASTE INVENTORY ISSUES

9. If "universal precautions[2]" are adopted for biomedical wastes, it is recommended that further inventory work be carried out to provide data for the sizing of potential biomedical waste management facilities. The B.C. Ministries of Health and Environment should consult closely on this issue should it develop further.

BIOMEDICAL WASTE MANAGEMENT TECHNOLOGIES AND PRACTICES

Segregation, Packaging and Labelling

10. It is recommended that the Province adopt the Canadian Standards Association methodology with minor modifications, for the segregation, labelling and packaging of biomedical wastes.

11. It is recommended that the compaction of packaged solid biomedical wastes destined for off-site treatment or disposal be discouraged or prohibited.

Off-site Transportation

12. Insofar as they apply to off-site transportation, it is recommended that the Province continue its present controls of biomedical wastes as special wastes through the Special Waste Regulation.

Use of Transfer Stations and Staging Areas

13. Concerning their suitability for biomedical wastes, it is recommended that waste transfer stations and/or collection depots be used only as collection or staging areas. Biomedical waste should not be compacted at these facilities, in order to preserve the integrity of packaging.

14. Should biomedical wastes be properly segregated, packaged, and labelled, and handled at transfer stations, to help avoid misperception of the risks of managing biomedical wastes, it is recommended that consideration be given to dedicating specific transfer station areas, and perhaps times, for transferring biomedical wastes. Adequate training of transfer station staff should be provided and consideration given to needs for contingency plans, government permits, and special equipment.

15. In the event that biomedical wastes are not properly segregated from the normal refuse stream, it is recommended that the use of transfer stations for biomedical wastes before final disposal be stopped. These wastes should be taken directly to a disposal facility from source, until adequate segregation is achieved or alternate arrangements to handle biomedical wastes at the transfer station are arranged.

2 "universal precautions" means the policy where all human blood, blood products and body fluids are considered infectious.

Central Disposal Facilities

16. It is recommended that as appropriate, feasibility studies, providing an indepth analysis of the options, costs, availability, and acceptability of centralized biomedical waste treatment, collection, and disposal facilities be carried out for high population areas of the Province. The allocation of responsibility for this project between the Province, regional governments, and the private sector should be determined.

Incineration

17. It is recommended that an ad hoc working group be struck to develop criteria for discharges, design, and operation of biomedical waste incinerators in British Columbia.

18. It is recommended that the costs of upgrading existing biomedical waste incinerators to meet any new National or Provincial discharge guidelines be determined.

19. It is recommended that the potential of existing or planned incinerators in the Province to dispose of biomedical wastes be studied.

20. It is recommended that the incineration of all categories of biomedical wastes identified by the Task Force be regarded as acceptable, with the proviso that pure liquid biomedical wastes are not burned and that the incinerators are capable of and operated so they properly destroy each waste type.

Sanitary Landfill Disposal

21. It is recommended that the sanitary landfill disposal of 1) special biomedical waste that has not been pretreated and 2) waste chemicals and pharmaceuticals be considered unacceptable. Sanitary landfill disposal of solid special biomedical waste that has been sterilized or disinfected should be considered acceptable, provided that sharps have been: 1) blunted or ground and then pretreated or 2) solidified; and that human anatomical waste is excluded. The remaining solid infectious wastes which do not include special biomedical wastes, should not require pretreatment before sanitary landfill disposal.

22. It is recommended that all biomedical wastes that are disposed of in a sanitary landfill, irrespective of their pretreatment status, be covered immediately following disposal.

Sanitary Sewer Disposal

23. It is recommended that certain biomedical wastes may be disposed of in sanitary sewer systems. All liquid infectious biomedical wastes may be discharged to sanitary sewers without pretreatment, with the exception of liquid special biomedical wastes. The remaining infectious liquid wastes, which do not include liquid special biomedical wastes generally, may be discharged to sanitary sewer without pretreatment. Waste chemicals and pharmaceuticals generally should not be discharged to sanitary sewer.

Disposal of Specific Biomedical Waste Categories

Contaminated Solid Animal Anatomical Waste

24. It is recommended that a review be carried out on the practices of using solid animal anatomical waste contaminated with pharmaceuticals or infectious organisms for animal feed, fertilizer or in rendering plants.

Waste Sharps

25. It is recommended that a specific management strategy for waste sharps that is accessible to various types of generators, from individual doctors and sharps generators, to large institutions, be devised and implemented. This strategy may involve various collection, storage, treatment, and disposal options.

26. Before disposal to a sanitary landfill, it is recommended that waste sharps be immobilized by solidification or destroyed by incineration, or grinding and disinfection.

Chemical and Pharmaceutical Waste

27. It is recommended that disposal guidelines for small quantities of pharmaceuticals and chemicals from biomedical wastes generators be developed.

28. It is recommended that the Waste Management Act's Special Waste Regulation continue to apply to waste pharmaceuticals and chemicals.

29. It is recommended that specific systems to handle waste pharmaceuticals from patients, doctors, pharmacies, and clinics be developed. Collection, return, and disposal methods should be considered. Return of waste pharmaceuticals and recycling of chemicals should be encouraged.

Blood, Blood Products and Other Bodily Fluids

30. It is recommended that the disposal of small quantities of non-infectious blood, blood products and other bodily fluids to sanitary sewer systems be legally permitted. Sanitary sewer disposal of specified infectious blood and blood products, should be permitted after disinfection or sterilization.

Infectious Non-Anatomical Wastes

31. As long as they do not qualify as special biomedical wastes, it is recommended that non-anatomical wastes may be disposed of without pretreatment.

Recombinant DNA and Biotechnology Wastes

32. It is recommended that the Province should encourage National and International initiatives to develop controls for wastes from recombinant DNA and biotechnology activities, and keep abreast of developments in this field.

LEGISLATIVE AND REGULATORY PROGRAMS AND GUIDELINES

33. It is recommended that continued support be given to the Canadian Council of Resource and Environment Ministers (CCREM) in its development of national guidelines for on- and off-site biomedical waste management practices.

34. General controls for a variety of biomedical waste practices are required now in British Columbia. It is recommended that one of the following four general methods be adopted:

Method 1:

The Province should develop and implement Provincial guidelines for biomedical wastes independent of ongoing efforts to develop National biomedical waste guidelines. The Canadian Standards Association Standard "Handling of Waste Materials within Health Care Facilities" should be adopted as Provincial policy, supplemented with specific modifications to address issues requiring additional attention, for example:

1. Improve the classification and controls for blood, blood products and body fluid wastes.

2. Supplement with detailed guidance for off-site biomedical waste management.

3. Provide a means of identifying biomedical wastes that have been rendered non-infectious through sterilization or disinfection.

4. Provide alternate colour coding to that presented for filled sharps containers and pharmaceutical wastes.

5. Qualify references to preferred waste management options.

6. Provide guidance for the management of biomedical wastes from biotechnology and recombinant DNA work.

Method 2:

In the period when National guidelines for biomedical waste practices are being developed, the Province should develop and implement Provincial guidelines for biomedical wastes, as described in Method 1. In the event that compliance with the Provincial guidelines were poor the Province should frame them in regulatory form.

Method 3:

During the period of development of National guidelines for biomedical waste management, the Province should develop and implement its own guidelines for biomedical wastes, as described in Method 1. When National biomedical waste guidelines become available, the national guidelines would replace those developed previously by the Province.

Method 4:

The Province, through the Ministries of Health and Environment, should immediately develop and implement legislative and regulatory controls for biomedical waste management in British Columbia, based on the controls described in Method 1. Consideration should be given to adopting National guidelines or amending Provincial ones when the former become available.

In view of strong evidence of the failure of the present system for managing biomedical wastes, despite efforts of regulatory agencies, the Task Force favours Method 4.

REGULATORY AGENCY ADMINISTRATION

35. It is recommended that resources to administer biomedical waste control programs be supplied by regulatory agencies as the long-term biomedical waste strategies are developed and implemented.

36. It is recommended that powers to certify crematoria under the Provincial Cremation Act be transferred to the Ministry of Environment.

COMMUNICATIONS, INFORMATION AND TRAINING

37. It is recommended that information and educational materials and programs on the hazards and controls for biomedical wastes be prepared, and made available to the appropriate audiences.

APPENDIX

GENERAL BIOMEDICAL WASTE DEFINITIONS

Biomedical wastes means those discarded materials from humans or animals which, due to their nature and source, categorized below, may require specific treatment before disposal.

Biological wastes means solid and liquid wastes from human metabolic functions including feces, urine, vomitus, dialysis byproducts, and the like.

Infectious means being contaminated or suspected of being contaminated with the causative agents, or their toxic products, of a communicable disease, and capable of transmitting such disease to susceptible individuals or animals.

Special biomedical waste means any waste falling under the following seven biomedical waste sources and types:

1) isolation wastes - includes, for example, wastes from patients placed in isolation for reasons other than protection or reverse isolation, as laid out in the CDC guidelines for isolation precautions.

2) waste cultures and stocks of infectious agents and associated biologicals - includes, for example, specimens from medical and pathology laboratories; cultures and stocks of infectious agents from clinical, research, and industrial laboratories; wastes from the production of biologicals; disposable culture dishes, and devices used to transfer, inoculate, and mix cultures; and discarded live and attenuated vaccines.

3) waste human blood and blood products - includes, for example, waste blood, serum, plasma and blood products.

4) wastes from surgeries and autopsies performed on patients and animals - includes, for example, tissues, organs, body parts, blood, and body fluids removed during surgery, autopsy, and biopsy.

5) wastes from patients and animals known to be infected by blood-borne diseases - includes, for example, equipment from surgery, autopsy, laboratories, dialysis units, and other material contaminated from care of patients with diseases such as AIDs and hepatitis B.

6) waste sharps - includes, for example, broken glass, hypodermic needles, and other sharp wastes, whether infectious or not.

7) waste contaminated animal carcasses, body parts, and bedding - includes, for example, animal carcasses, body parts and bedding of animals intentionally exposed to infectious organisms in research, in the production of biologicals or the in vivo testing of pharmaceuticals.

Biomedical Waste Categories

1. Solid human anatomical wastes, including any body part or tissue except extracted teeth, hair, nail clippings, and the like, but excluding biological wastes.

2. Liquid human anatomical wastes such as blood products, secretions, and similar body fluids, but excluding biological wastes.

3. Infectious animal solid and liquid wastes, including animal carcasses, body parts, body fluids, bedding materials, and associated biological wastes.

4. Infectious biological wastes.

5. Infectious nonanatomical wastes directly associated with patient care such as bandages, gowns, masks, gloves, tubing, and similar equipment.

6. Waste sharps including hypodermic needles, syringes, scalpel blades, pasteur pipettes, and broken glass.

7. Infectious microbiological wastes including serums, vaccines, cultures, and stock used in clinical, research and industrial applications, and their associated fomites.

8. Chemical and pharmaceutical wastes including antineoplastics and associated fomites.

9. Supplementary biomedical waste categories include:

   - noninfectious animal anatomical waste
   - pharmaceutical contaminated animal anatomical waste
   - equipment and materials contaminated with chemical and pharmaceutical waste.